CHP
Combined Heat & Power
in Kentucky

Center for Renewable Energy Research and Environmental Stewardship

October 30, 2014

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2014 Combined Heat and Power Activities

KY Department for Energy Development and Independence

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Efficiency and Conservation

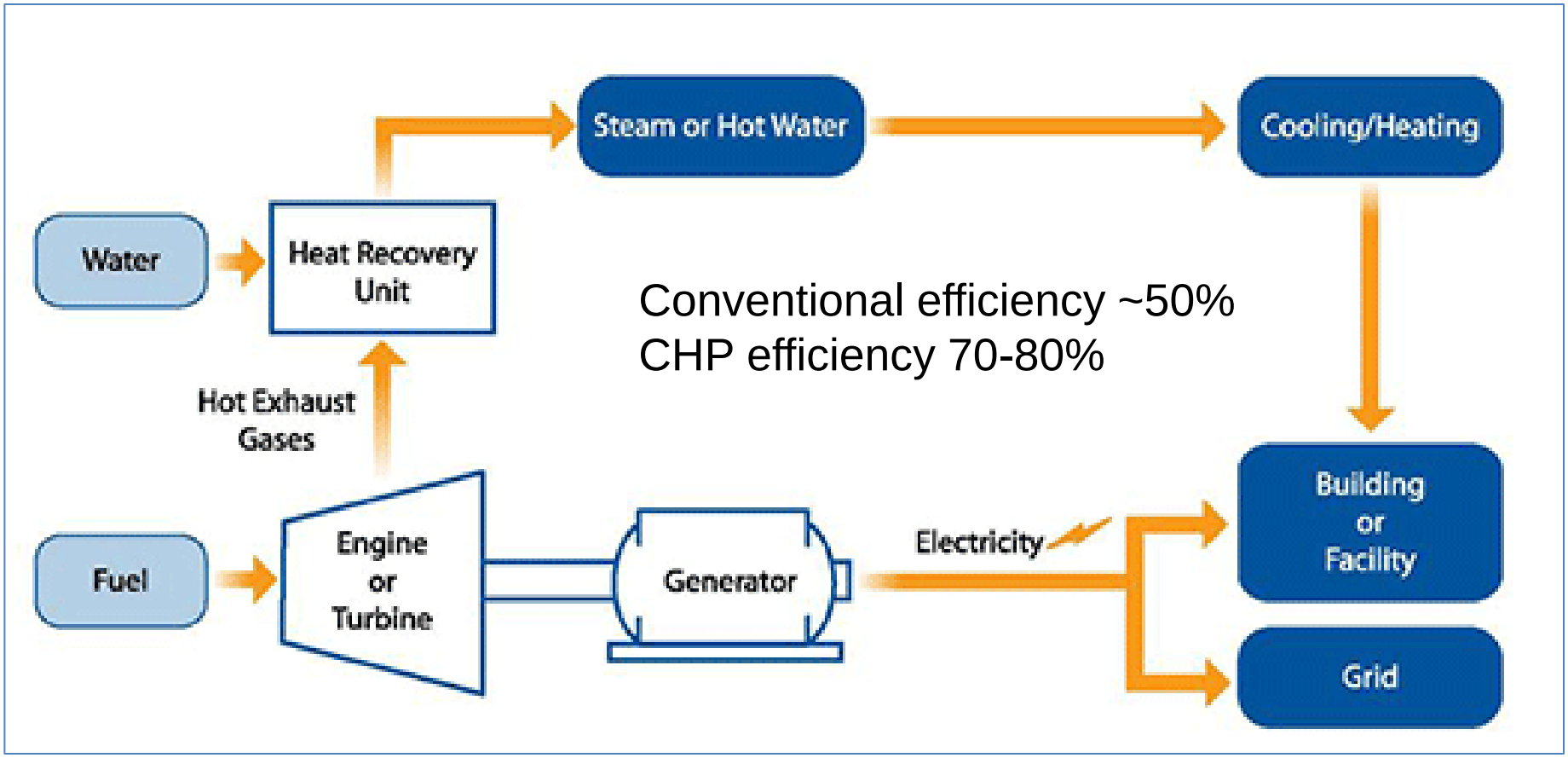
What is Combined Heat and Power?

- **CHP, or Cogeneration, is the simultaneous generation of electrical power and useful thermal energy near the point of use.**
  - CHP is comprised of:
    - A "Prime Mover" or means of turning an electrical generator.

    And…

    - A Heat Recovery System
  - Some technologies used include: reciprocating engines, combustion turbines, or boiler/steam turbines.

What is Combined Heat and Power?



Why Use Combined Heat and Power?

- **Potential for certain industries to reduce operating costs through increased energy efficiency**
  - Efficiency gains from the waste heat recovery
    - ~10% to 40% depending upon type of system and operational parameters.
  - Some efficiency gain due to close proximity and power line loss avoidance
    - ~5% depending upon where you are in the grid
  - Some industries have waste products that may be used as a fuel
  - Take advantage of “Spark Spread,” or the difference between electricity cost and the CHP fuel cost.
    - Smaller advantage in KY due to low cost of electricity.
- **Benefits to critical infrastructure during grid downtime**
  - E.g. Ice or wind storms

Background of the CHP Initiative

- Manufacturing accounts for ½ of all of the electricity use in Kentucky
- There is national and local interest in combined heat and power
- Industry needs to improve efficiency to remain competitive – especially as Kentucky's historically low electric prices rise
- Executive Order -- Accelerating Investment in Industrial Energy Efficiency (August 30, 2012)
  - "…coordinate and strongly encourage efforts to achieve a national goal of deploying 40 gigawatts of new, cost effective industrial CHP in the United States by the end of 2020"
  - Regional CHP Support (Southeast CHP Technical Assistance Partnership covers KY – 6 other regional TAP Centers nation-wide)

Background of the CHP Initiative Continued

- **2 KY grants effective in 2014 to promote CHP**
  - Advancing Industrial Energy Efficiency (2-year SEP Competitive grant from DOE)
  - CHP Partnership (4-year sub-award through the Southeast CHP Technical Assistance Partnership)
- **Grant Partners**
  - Kentucky Pollution Prevention Center (KPPC)
  - Kentucky Association of Manufacturers(KAM) and Foundation for Kentucky Industry (FKI)

Stakeholder Involvement

- **Steering Committee**
- **Coordinating Workgroup**
  - Education and Outreach Subcommittee
  - Technical Subcommittee
  - Finance Subcommittee
  - Policy and Interconnection Subcommittee

Each group will meet 4-6 times during the life of the project – mostly wrapped up by end of 2014.

Stakeholder Topics

Finance	Policy	Technical Application	Education & Outreach
Electricity $	ePAD	Recip. Eng. Maintenance	Workshops
Gas $	Permitting	Permitting	Webinar
Performance Contract Case Study	Interconnection	Interconnection	Marketing Activities
Energy Savings Agreements	Impact of Environmental Requirements	Vendor List	Networking Event
Finance Options Guidance	Thermal Sales	Heat Load Guidance	
Industrial Revenue Bonds	CHP/PSC Staff Opinion	Turbine Maintenance	
Tax Incentives	Tax Incentives	Reference Library	
USDA Programs	Feed in Tariff	Electricity/Heat Load Balance	
Rebates	Portfolio Standard/Public Benefits Fund	Waste Heat to Power	
Third Party arrangements	Third Party arrangements	Reliability	
Standby Rates	Standby Rates	fuel Issues	
	Net Metering	Integrating CHP into existing Systems	
	DSM Programs		

Legend	
	completed discussion, share by E/O
	work in progress
	upcoming activities
	waiting on information
	put in the parking lot

Stakeholder Topics - Continued

Sub-committee Presentations:

- Reciprocation engine maintenance – Whayne Company
- CHP Permitting – Division of Air Quality
- Electricity Rate Structure – KPPC and Harshaw Trane
- ePAD legislation – Greater Cincinatti Energy Alliance
- Industrial Revenue Bonds – Economic Development Cabinet
- Energy Savings Agreements – Hannon Armstrong
- Natural Gas Outlook – Fellon McCord

Key Issues

- **Site specific factors – e.g. 24/7 operation; need electricity & heat; etc. – KPPC can do screening and assessment**
- **Spark spread – i.e. fuel prices**
- **Standby rates/ratches – utility specific, negotiated**
- **Permitting**
- **Financing – various options**
- **Third party agreements**
- **Legislation – ePAD and tax credits**

Conferences and Media Representation

- May KAM Energy Conference
- August DLG Local Issues Conference
- October Governor's Conference on Energy and the Environment – Ft Knox Briefing
- The Lane Report
- KAM "The Goods" newsletter
- Land Air and Water Publication
- Website for CHP Stakeholder Sessions
  - http://energy.ky.gov/Programs/Pages/chp.aspx

Upcoming Activities: CHP Workshops

- **November 6, 2014 – Bowling Green, KY**
  Western Kentucky University
  Knicely Conference Center, Room 112
  2355 Nashville Road
  Bowling Green, KY 42104
  9:00 a.m. to 3:30 p.m. CST
- **November 13, 2014 – Richmond, KY**
  Eastern Kentucky University
  Quad A, Perkins Building
  521 Lancaster Avenue
  Richmond, KY 40475-3102
  9:00 a.m. to 3:30 p.m. EST

http://www.kam.us.com/events/kentucky-chp-workshops

CHP Workshop Topics

CHP 101

- Overview
- Technologies
- Kentucky Installations
- Benefits & Risks

Fuels

- Natural Gas
- Biomass
- Biogas

Financing Options/Incentives

Economics

- Demand Management & Ratchets
- Stand-by Charges

Policy Implications

Panel Discussion

Upcoming Activities

- **CHP Action Plan**
  - Should be published by end of 2014
- **CHP Webinar**
  - Planned for January 2015
- **Networking Event/CHP Demonstration**
  - Planned for March 2015
- **Technical Screenings and Feasibility Study for Potential End-Users -** throughout grant period (and beyond if resources allow)

Steps to Success

- **CHP projects require a large investment in time, money and expertise**
  - "Will CHP be a good idea for my company?
- **A key component for the CHP initiative in KY is having developed in-state expertise utilizing KPPC in conjunction with the Southeast Technical Assistance Partnership for screening activities**
  - **Pre-screening** – Utility bills, operations, company goals, energy loads, and other site data
  - **Technical screening** – Type of system required, and how system operation would meet energy needs
  - **Preliminary economic screening** – spark spread, installation costs, maintenance costs, total costs of generating electrical power and considering value of thermal energy recovered, Simple Payback, ROI, ROR, or other method. (May be included as part of technical screening)
  - **On-Site Feasibility Analysis**
    - Greater level of detail for technical, financial, and other project requirements to gauge potential for success
  - **Investment Grade Audit –** May be separately contracted by the company and include additional lender or company requirements
- **Design**
- **Construction**

Questions?

- **Questions/Comments?**
- **Next Work Group Meeting: December 11th, 9:30am, DEP 301D Fair Oaks, Frankfort**
- **You are invited!**

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CRERES Meeting
CHP Update

Frankfort, KY
October 30, 2014

http://energy.ky.gov/Programs/Pages/chp.aspx

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